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BIOGAS PRODUCTION FROM WHEAT STRAW PRE-TREATED WITH LIGNINOLYTIC FUNGI AND CO-DIGESTION WITH PIG SLURRY

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Abstract

This study carried out for the first time a comparison among ligninolytic (white-rot) and cellulolytic or xylanolytic (*Trichoderma*) pre-treated wheat straw, for biogas production, potential, without or with pig slurry in co-digestion. Methane (CH₄) production from wheat straw pre-treated for 4 and 10 weeks with seven different fungal isolates was preliminarily measured. Then, the effects on biogas yield of the co-digestion with pig slurry were checked on straw pre-treated with 3 selected fungal strains. The maximum production of CH₄ from pre-treated straw with *Ceriporiopsis subvermispora* (SUB) for 4 and 10 weeks was higher than the control (16% and 37%, respectively). The accumulation daily rate was higher than control (42% and 81%, respectively). A positive correlation between CH₄ accumulation daily rate and straw enzymatic digestibility was found. In co-digestion with pig slurry, SUB pre-treated straw for 10 weeks showed an accumulation daily rate of 17.4 mL d⁻¹ g⁻¹ VS, significantly higher (17%) than that of the control. The time to reach the maximum CH₄ production was shortened on average from 34 to 21 days in co-digestion with pig slurry, in comparison with pre-treated mono-digested wheat straw. The biological pre-treatment with selected white-rot fungi appears a promising technology to increase methane production from wheat straw.

Key words: biogas, *Ceriporiopsis subvermispora*, co-digestion, enzymatic hydrolysis, manure

Received: December, 2014; *Revised final:* June, 2015; *Accepted:* June, 2015

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